THE RE-USE OF VACATED COMMERCIAL SITES IN DOWNTOWN BOSTON

Archives
MASS. INST. OF TECHNOLOGY
JUL 22 1958
LIBRARY

by

BRIGITTE G.ORENT

B.A., Oberlin College
(1951)

SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE
DEGREE OF MASTER IN
CITY PLANNING
at the
MASSACHUSETTS INSTITUTE OF
TECHNOLOGY
June, 1958

Signature of Author. . . . .
Department of City and Regional Planning, May 20, 1958

Certified by. . . .
Thesis Supervisor

Accepted by. . . . .
Chairman, Departmental Committee on Graduate Students

ABSTRACT

THE RE-USE OF VACATED COMMERCIAL SITES IN DOWNTOWN BOSTON

by

Brigitte G. Orent

Submitted to the Department of City and Regional Planning on May 20, 1958, in partial fulfillment of the requirements for the degree of Master of City Planning

Essentially this study is a sectional view of a continuous process, viz. the succession of urban land uses. It looks at this process by investigating thirty-two sites in central Boston vacated by twenty-six firms which moved, in the years 1954 to 1957, to new quarters on a circumferential highway ten miles outside Boston. On the basis of a survey of these downtown sites, an attempt has been made to answer the following questions:

Has there been a loss in employment and assessed valuation on these sites ?

What are the characteristics of activities which have moved into the vacated premises ?

Do changes in the kind of activity taking place in downtown Boston conform to trends in other central cities ?

What are the implications for public policies ?

A general discussion of the characteristics of activities in central cities other than Boston is provided as a background for the evaluation of the findings.

Despite considerable losses in employment and assessed valuation on these sites, the kinds of activities which have replaced the old firms are probably in a better position to profit from central city location. Changes taking place in Boston conform generally to those in other cities; that is, large firms, especially manufacturers of standardized products, leave the central city and are replaced by small firms with unstandardized inputs or outputs. However, the small central city firm also is spreading out and seeking more space per employee.

It seems justified to view what has happened on these thirty-two sites not as an irreparable loss to Boston but rather as a better adjustment of economic activities and physical setting.

Thesis supervisor: John T. Howard
Title: Chairman, Department of City and Regional Planning

LETTER OF TRANSMITTAL

Massachusetts Institute of Technology
Cambridge, Massachusetts
May 20, 1958

Professor John T. Howard
Department of City and Regional Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Professor Howard,

In partial fulfillment of the requirements for the degree of Master in City Planning, I submit this thesis entitled "The Re-use of Vacated Commercial Sites in Downtown Boston".

Sincerely yours,

Brigitte Orent

CONTENTS

ACKNOWLEDGMENT

It would not have been possible to undertake this thesis without the cooperation of Martin Wohl and others engaged in the Route 128 Study. I am also grateful to Mr. Gibney of the Massachusetts Department of Commerce for his assistance in locating data. Finally, I want to thank Professors Howard and Greeley and Bernard Frieden of the Department of City Planning for their help and for asking a few and answering many questions.

I. INTRODUCTION

A. The Thesis

Despite political divisions, the economic activities of metropolitan areas are "inextricably intertwingled". The construction of a new circumferential highway, Route 128, in the suburbs of Boston has had effects even on the central city, for the majority (79%) of industries which have been attracted to Route 128 came from intown sites.[1]

It is customary to view the move of economic activities to the suburbs as a loss to the city, forgetting that change may imply growth as well as decline. Insofar as they represent an adjustment to economic realities, these moves may indeed by salutary. They indicate a changing role for the central city. Losses to the city in tax base or employment are due not as much to these shifts as to other pervasive forces.

This is the thesis. To prove it would require a comprehensive metropolitan economic study. But a clue may be provided by investigating what has happened to the sites that were formerly occupied by firms which have moved to Route 128. Thirty-two sites were vacated by twenty-six such firms within an area two miles of Boston's State House in the years 1954 through 1957. On the basis of a survey of these sites, an attempt has been made to answer the following questions:

> Has there been a loss in employment and assessed valuation on these sites ?
>
> What are the characteristics of activities that have moved into the vacated premises ?
>
> Do changes in the kind of activity taking place in downtown Boston conform to

trends in other central cities ?

What are the implications for public policies ?

B. Limitations of the Study

Essentially then this study is a sectional view of a long-term, continuous process, viz. succession in urban land uses. It catches this process in a four-year span on selected sites. It is a biased view, not a comprehensive or representative one, because the industries which were in a position to move to new quarters on Route 128 were prospering. By and large they did not occupy shoddy premises before they moved; they were already pretty well up the economic ladder. Thus the sites investigated do not include all kinds and conditions of real estate in central Boston. Nonetheless, as it turned out, this selected group of sites encompassed a large array of commercial and industrial space, from one-story plants to old lofts, from good office space to a converted house in a residential area.

C. How the Study Fits into Planning

How such a study fits into the planning process was stated thirty years ago by Haig:[2]

> "It was hoped that by observing what is actually happening in the competitive struggle for urban sites, and existing tendencies in the location of economic activities, it might be possible to glimpse the outlines of an economically ideal pattern or plan; that by examining what was being crowded out of the choice central locations and what was doing the crowding, it might be possible to infer where 'things belonged'".

Recently Peter Self wrote:[3]

> "A good development plan is based on a thorough survey of the requirements and intentions of industrialists, so that their

> proposals for extensions, their willingness to move to new sites, and their probable labour requirements are all known to the planning authority"...for... "Industrial location has a profound impact on the provision and utilization of social capital."

A more classical economist than Haig might argue that things will go where they belong without the planner interfering. However, if the physical environment is viewed as a flexible mold into which activities must fit, it remains true that the process of mutual adjustment between changing activities and the relatively fixed environment can be abetted or hindered by public policies.

Thus, the planner makes this kind of survey not so much in order to say where "things belong" but rather in order to determine the inadequacies and breakdowns of the market mechanism, to lubricate the process of ajustment, and to provide a basis on which all kinds of inevitable decisions about public capital investment can be made.

II. CHARACTERISTICS OF ACTIVITIES IN CENTRAL CITIES OTHER THAN BOSTON

Rapid decentralization in recent years has made planners, politicians, and public aware that there are maladjustments between, on the one hand, economic activities and, on the other hand, the accommodations and facilities provided by the city. In the following section these three elements - (1) the firms or activities, (2) the physical setting, and (3) the process of adjustment between them, will be discussed separately insofar as possible. A general background is provided in order to determine to what extent the movement of firms in Boston conforms to trends in other central cities.

A. The Firms or Activities

To understand who or what thrives in central areas it is necessary to look at the internal organization of business. As firms grow and their need for a particular part or service increases, it may be cheaper for them to buy it on the outside than to make or do it themselves; this is particularly true if the process is complicated or the demand for it sporadic. Specialized firms which provide a particular service or part for a number of businesses often require a central location.

Furthermore, as Haig pointed out,[4]

> "Every business is a packet of functions, and within limits these functions can be separated and located at different places."

Small firms in which this "packet of functions" may be carried out by one man obviously cannot take advantage of economies resulting from locating, for instance,

the manufacturing function in the suburbs where space is cheap and the sales function in a central prestige location where rent is high.

A recent study[5] of the New York region revealed that in all industries, the small firms show a persistant tendency to locate in the central area and the larger firms on the periphery. The average number of employees per establishment is:[6]

	in the central city	in the ring
Boston	38	63
New York	25	58
Chicago	60	103

Uncertainty about future space and labor requirements is another feature which distinguishes the small firm from a large one. The central city with an abundance of rental quarters and access to a large labor market makes contraction and expansion easier and less costly. Furthermore, the economies of scale of the large firm are often achieved in the small one by sub-contracting to a specialist who has enough business through these sub-contracts to realize equivalent savings. As has already been stated, for the specialist who needs to be close to customers or clients, the center of the city is the best "equilibrium point".

In the city there are also "external economies" which substitute for scale economies elsewhere. Sewer and water, police protection, etc.: these can be obtained by paying a fee or taxes rather than having to provide them yourself.

Finally, firms which deal with unstandardized inputs or outputs need to be in the center where face to face contact or personal inspection of the final product is convenient. Unstandardized inputs are

characteristic of business services. They require "a heterogeneous and constantly changing mix"[7] of lawyers, bankers, consultants, gossip of the trade. The time of valuable men would be lost if these activities were not clustered closely in a central location.

Examples of activities with unstandardized products are manufacturers of high-style dresses and hats, buttons, furs, toys; job-printers; dealers in diamonds or art objects, etc. These firms also require a central location in order to be accessible at a minimum cost to the buyer; and they must cluster together since the buyer often wants to do comparative shopping. Because the fabrication of the products is essentially piece-production rather than assemly-line production, these firms can often make use of loft space.

It is apparent then, that there is a close connection between size, standardization, and the central location of a firm.

Already Haig in his studies of the New York region thirty years ago described the kinds of firms likely to remain in the center and those likely to leave. The characteristics of firms remaining in the central city were:[8]

"1. no specialized buildings required;
2. time or service factor an important element;
3. specialized, unstandardized, highly skilled work;
4. low ground area per worker required;
5. comparatively small scale work;
6. obsolete buildings suitable;
7. close contact with the market required;
8. highly seasonal, fluctuating labor force;
9. style factor important."

In addition to what has already been said, firms serving a metropolitan rather than a national market and those whose labor force is dependent on transit benefit from a central location.

Conversely, according to Haig, those firms likely to leave had the following attributes:[9]

"1. comparatively large size;
2. time or service factor unimportant;
3. large ground area per person required;
4. nuisance features - odors, noise, high fire hazard, etc.;
5. specialized buildings required;
6. serious problems of waste disposal;
7. large quantities of fuel and/or water required."

Recent studies have borne out some of Haig's predictions about the kinds of firms likely to stay in and to leave central areas. Changes over a number of years in the activities in the central business district have been recorded for Philadelphia (1934 and 1949) and for Cincinnati (1937 and 1953).

In Philadelphia retailers and manufacturers became fewer and larger, and business and consumer services more numerous on the average. Wholesaling had both more firms and larger firms, but the increase in the number of firms was only for wholesalers without stocks. Generally, goods-handling activities moved out, at least the larger users of space, while more and smaller establishments of all kinds, especially those requiring the presence of people, prospered in the center.[10]

Changes in Cincinnati tell a slightly different story. There the number of establishments decreased for all functions and the average space per establishment increased by 22%, except wholesaling without stock. In terms of floor area,

retailing decreased 16%
manufacturing decreased. 13%
wholesaling without stock decreased .37%.

On the other hand,

business services increased. 28%
wholesaling with stock increased. . .20%
off-street parking increased. . . . .52%.

For analysis, the Cincinnati CBD was divided into a "core" surrounded by a "frame". Retailing increased in the core, although it decreased in the CBD as a whole. Conversely, wholesaling was leaving the core but increasing in the CBD. Manufacturing decreased and business services increased in the entire area.[11]

The differences in Cincinnati from the Philadelphia findings were the 37% decrease in floor area in wholesaling without stock and the 20% increase in wholesaling with stock. This is contrary to the idea that the difficulty of goods movement is forcing manufacturing and wholesaling out. It may indicate, the Cincinnati study concludes, that manufacturing is moving out for greater production efficiency in one-story plants and retailing is decentralizing because people rather than goods have trouble getting to the central area.

That the above trends are not new is indicated by the fact that from 1900 to 1922 in the central part of New York City employment in manufacturing increased only 45% compared to approximately a 700% increase in business services.[12]

In general the findings in Philadelphia and Cincinnati seem to conform to Haig's predictions with one exception: In both cities, although firms have decreased in number, they have generally increased in size or in floor area. Apparently Haig's hypothesis that the larger firms move to the suburbs does not preclude those remaining in the center from becoming larger as well.

B. The Physical Setting

Firms seek a certain kind of building space in a particular location. The internal arrangement of the structure and the attached services and facilities affect the adequacy of the accommodations. External

requirements may include a certain site arrangement, i.e. frontage, a loading platform, parking, as well as a particular relation to other buildings and activities.

Obviously the center of a city has a unique position in the urban area, and firms located in it partake of this unique relation to other activities. Haig noted that the center possesses the essential quality of physical proximity, or accessibility, to all parts of the area. (Accessibility may be greater for people than for goods because transit lines usually converge near the center.) Haig's hypothesis was that all activities whose influence coincides with concentric circles from the center want to locate as close to it as possible. The ones who succeed in the competitive process for limited space are the ones who can turn the advantageous location into the highest profit.

Specifically, the advantages of a central location include:[13]

1. good transportation - transit for employees; rail for goods; air for out-of-town visitors;
2. a large and varied labor supply;
3. restaurants, shops, hotels, amusements for employees' noon-hour and for visitors;
4. cheaper and better communications: telephone, telegraph, messenger service.
5. business contacts: the concentration of services, organisations, government agencies;
6. flexible accommodations: a wide variety of space at all rent levels.

However, there are often disadvantages connected with central locations. These may be:[14]

1. congestion;
2. lack of space in the right location;
3. prohibitive rents in the desired location;
4. undesirable housing and living conditions necessitating long journeys to work for employees;
5. high taxes;
6. low quality of municipal administration.

Rent is of course the measure of desirability which separates those who can profit from central city advantages from those who do not need them. There are really two kinds of space costs - loft rentals, and land and building costs - which constitute distinct markets. Vernon found that in New York loft space which was not in a specialized district cost about the same throughout the city. Rents in unspecialized lofts were so low, about $1.65 a square foot, that new construction of loft space, which would cost $3.-4.00 a square foot, seems unlikely.[15] Also the supply of loft space or subdivided factory space is constantly increasing through the abandonment of old structures and their conversion to multiple occupancy.

The cost of constructing a one-story plant in a central location is prohibitive not only due to the land costs and greater profit from alternative uses, but also because it is impossible without eminent domain to acquire more than a two acre site in central New York.

Differences among types of firms in the ability to turn locational advantages into profit result in a certain distribution of functions in central areas. Murphy and Vance in an analysis of eight central business districts divided the CBD into four zones. Zone 1 was 100-yard walking distance from the peak land value intersection; zone 2, 100-200 yards, and so forth. They classified firms into retail, business service, and non-CBD functions (wholesale, industrial, public, organisational, vacant). The relative rank order of the four zones in proportion of space occupied by various types of establishments was as follows:[16]

	Zones			
	1	2	3	4
Retail	1	2	3	4
Business service	4	1	2	3
Non-CBD functions	4	3	2	1

Vacancy was highest in zone 1 because taxes and rents were high; also the oldest and most obsolete buildings were in this zone. Although theoretically it is the most desirable area, in fact a slightly less central location is often preferred.

The vertical distribution of functions within buildings was also analysed by Murphy and Vance. The relative rank order of the proportion of space used by types of establishments was as follows:[17]

	Floors		
	First	Second	Upper
Retail	1	2	3
Business services	3	2	1
Non-CBD functions	3	1	2
wholesale	1	2	3
industrial	2	1	3

This study showed further that clustering among similar types of firms occurred vertically in buildings as well as horizontally on ground floors.

It is Murphy and Vance's hypothesis that the CBD advances on certain fronts and contracts on others irrespective of whether the city is growing or not. They labeled the advancing front "zone of assimilation" and the contracting one, "zone of discard". The former contained the prestige offices, specialty shops, professional offices, etc. This zone of assimilation moved towards the high-class residential area not so much because of special attractive forces but rather because the other direction with industries and railroads was repellant. The zone of discard merely sold goods and services with no claim to prestige; it contained family clothing stores, cheap movies, bus stations, etc..

C. The Process of Adjustment

Despite Murphy and Vance's hypothesis that CBD's change irrespective of urban growth, it remains true that the primary occasion for a firm's change in location is the need for more space. When central location is not a necessity, the cost of space and the difficulty of expanding intown often result in a shift to the suburbs. In New York in a ten-year period 500 firms out of 250,000 in the city made this move, 1/5 of 1%. Most of them sought "more permanent and more efficient space arrangement."[18] Some retained central offices for the executive function and relocated only manufacturing or data processing.

As has already been indicated, manufacturing is being displaced from the center more rapidly than other functions, especially when durable or bulky goods are produced, for a number of reasons:[19] truck hauling has freed firms from rail terminal locations; industrial complexes in the suburbs can now provide "external economies" previously available only in the city; the efficiencies of one-story plant operation outweigh increased transportation costs or rentals; and the demand for business services which profit more from a central location is growing at a faster rate than the demand for manufactured products.

Gradually space vacated by manufacturing is absorbed by other functions. Offices move into non-manufacturing lofts and wholesalers move into space ordinarily used by light manufacturing firms. Apparently in New York the new manufacturing firm with an uncertain future has found little space available in Manhatten. The "incubator function" is being performed more by the outlying growing areas than by the central city.[20]

Rannels states that unless a business is reorganized, that is, separates its functions into several establishments, it will generally seek larger quarters in a location near its old site. The loss due to interrupting operations usually prevents a firm from razing its old building and constructing a new one on the same site.

Of course vital and necessary linkages to other activities is one of the main reasons firms remain in the center. In fact some businesses are anchored - fire insurance firms to the rating bureau, custom brokers to the waterfront, etc. A whole specialized district may shift slightly over a period of years, but the individual firm must remain in it.

Thus each firm seeks an adjustment with these opposing forces - on the one hand, the desire for more space at reasonable rentals, and, on the other hand, the need for a location proximate to activities with which it is linked.

D. Classification of Activities

Classifications must be based on the purpose for which they are to be used. If the planner's purpose is to facilitate the adjustment between activities and the physical setting, then his classification of central city functions must take into account the essential aspects of these two elements.

With respect to activities, in the above discussion it was found that firms with unstandardized inputs or outputs usually prefer central areas. Ideally, then, firms should be classified on this basis. However, since this would require a thorough study of the "raw materials" (maybe people), organization, and product of each activity

such a basis for classification could only be approximated in this thesis.

Furthermore, from the standpoint of the physical setting, the center is unique in its accessibility to large numbers of people. Firms which benefit by face to face contact between people approach the center to the extent that they can afford it.[21]

Although the following classification, which will be used in this thesis, is not tidy from an analytic standpoint, it does combine two elements significant to the planner:

(1) the need for people-contact, i.e. the degree of centrality required.

(Some kinds of retail-type uses achieve greater "people-contacts" by decentralizing. The kind of people-contact meant here stems from the requirements of business establishments rather than from those of residences.)

(2) the type and amount of space sought.

The first category below, retail-type uses, generally needs the most people-contacts and the least space; and the last category, the footloose manufacturer, by definition needs the least people-contacts and the most space.

The following classification is a modification of one suggested by Shirley Weiss.[22] Central city land uses which do not occur in the sites analyzed in this thesis have been omitted: parking, public and semi-public uses, residential.

A. Retail-type uses

Retail trade establishments; consumer services.

B. Office-type uses

Real estate, finance, insurance; professional offices; manufacturer's sales offices; wholesale agents and brokers without stock.

C. Linked Light Industrial

Firms with unstandardized, small products, e.g. garments, shoes, printing; or with service and sales to customers, e.g. job printing, statistical processing.

D. Linked Wholesale with Stocks

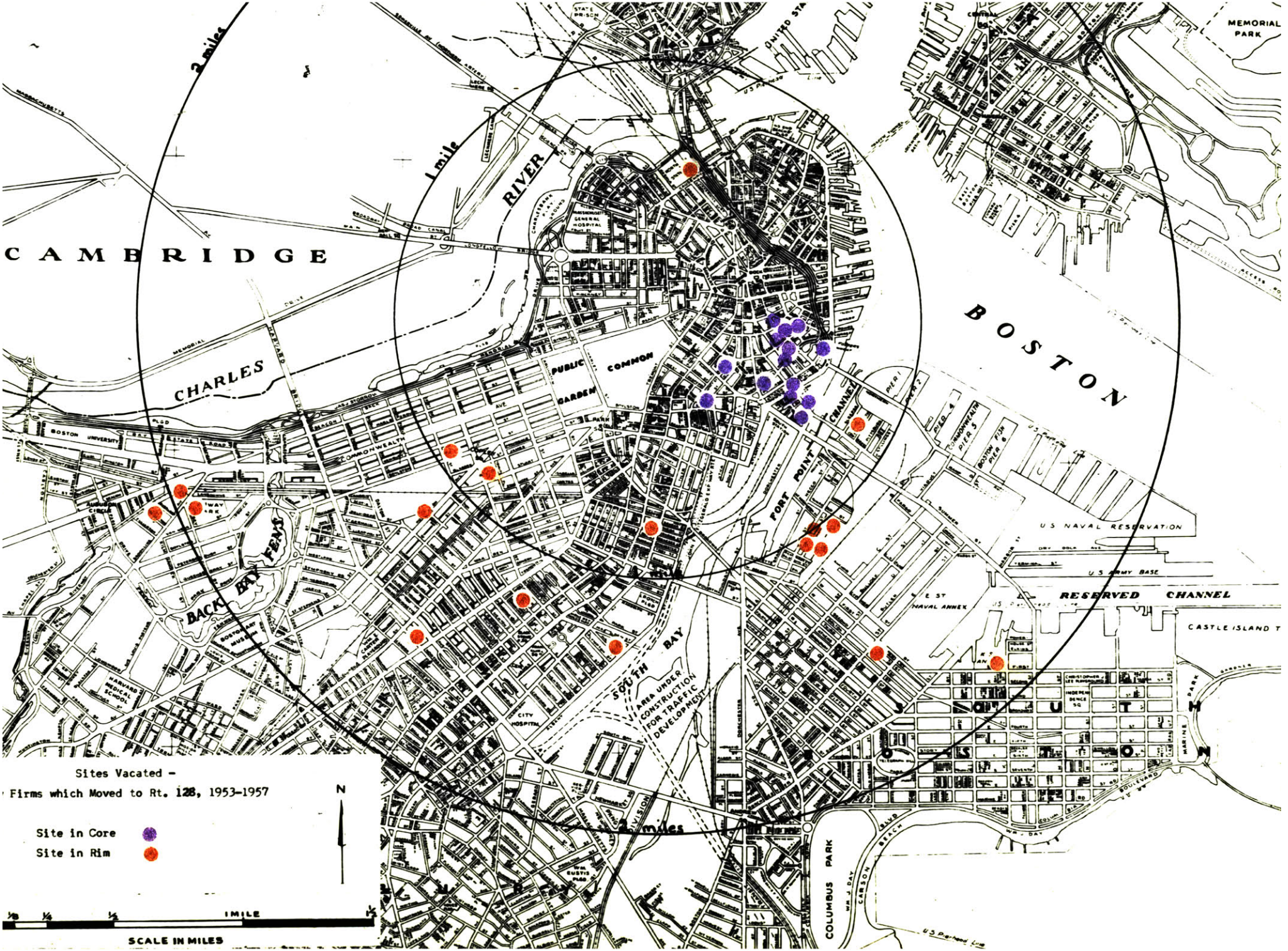
Merchant wholesalers with showrooms, etc.

E. Footloose Wholesale with Stocks

Warehouses; storage.

F. Footloose Industrial

Firms with standardized, bulky products. No contact with customers.


2 miles
1 mile
RIVER
CAMBRIDGE
BOSTON
CHARLES
PUBLIC
COMMON
GARDEN
BACK BAY FENS
FORT POINT
CHANNEL
SOUTH BAY
AREA UNDER CONSTRUCTION FOR TRAFFIC DEVELOPMENT
U S NAVAL RESERVATION
U S ARMY BASE
RESERVED CHANNEL
CASTLE ISLAND
COLUMBUS PARK
MEMORIAL PARK
Sites Vacated -
Firms which Moved to Rt. 128, 1953-1957
Site in Core
Site in Rim
N
1 MILE
SCALE IN MILES

III. FINDINGS: THE RE-USE OF VACATED SITES

From the beginning of 1954 through the summer of 1957 twenty-six firms moved from an area within two miles of the heart of Boston to new quarters on a recently completed circumferential highway ten miles outside Boston . These twenty-six firms were located on thirty-two sites in central Boston since three firms had more than one establishment downtown. (The firms which moved to Route 128 will be referred to in the following sections as the old firms; those which took over the vacated premises, as the new firms.)

Fourteen of these thirty-two sites were in the downtown core of Boston, and eighteen were in the rest of the two mile area. The area outside the core but within the two-mile radius will be called the rim.

All the sites had structures on them. Some of the vacated premises were only rented quarters in buildings occupied by many tenants. In other cases the whole structure was formerly occupied, owned or rented, by the old firm.

The sites were personally visited and each new firm on the site was interviewed briefly. (See Appendices for more complete record of findings).

A. The Firms or Activities

Number. Sixty-one establishments are now occupying twenty-five sites. Two sites were taken for highway construction and five buildings are still entirely vacant.

Type. All types of firms increased in number except the "footloose wholesale" and "footloose industrial". Specifically, the number of old and new firms by type is as follows:

	Old Firms	New Firms
Retail-type uses	1	2
Office-type uses	6	25
Linked industrial	7	17
Linked wholesale	6	13
Footloose wholesale	8	4
Footloose industrial	4	0

Employment. The twenty-six firms which left town employed 3,908 persons. The employment in the identical floor area is now 2,028. Therefore, on the basis of this space alone there has been a loss of 1,880 employees in Boston.[23] Even if the currently vacant space were filled at the rate of the average floor space per employee there would still be a loss of 1,190 employees.

In terms of type of activity, employment in the office and linked wholesale categories increased. All other uses decreased in employment. Since there were more estalishments and fewer employees, naturally the average number of employees per establishment decreased; this was true of all uses. The average number of employees per establishment among the old firms was 150; among the new, 33.

Age of new firms. The median age of the 61 new firms was 32 years; the average age, 26 years. None of the firms were less than 10 years old, and only nine of them were established since the beginning of World War II.

Previous location. Thirty of the new firms moved into the ten occupied sites in the core; thirty-one new firms moved into the fifteen occupied sites in the rim.

Where did these new firms come from ? Out of the 46 which answered this question, 27 shifted around in the same area; that is, 14 moved from one core location to another and 13 moved from one location in the rim to another. 6 firms moved centrifugally from the rim to

the core; 13 moved centripetally from the core to the rim.

	Core	Rim
Expand or shift in.....	14	13
Into from the core.....	-	13
Into from the rim.....	6	-
Into from outside two-mile area.....	2	4

Two firms were entirely new to the city of Boston; one of these came from outside the metropolitan area.

B. The Physical Setting

Floor area. Of the 1,089,000 square feet of floor area, 64% is now in use, 32% is vacant, and 4% has been demolished.

Those activities dependent on people-contacts increased in floor area at the expense of footloose wholesale and footloose industrial.. Office use increased most both in floor area and in number of firms.

Floor area per employee. All types of activities increased in the average number of square feet per employee; that is, new firms were more spread out and less crowded than the old ones.

Floor area per firm. For each type of activity, the new firms occupied less floor space than the old ones. Office users had the least space per firm and the former footloose industrial, the most.

Condition of structure and vacancy. On the basis of age, maintenance, and obsolescence the thirty structures were rated roughly as good, fair, or poor. Buildings entirely or substantially vacant for more than six months rated as follows:

2 out of the 13 good buildings,
3 out of the 9 fair buildings,
7 out of the 8 poor buildings.

Assessed Valuation. Most built-up cities are decreasing in assessed valuation each year due to the gradual depreciation of buildings. Total valuation of real estate in Boston in 1953 was $ 1,428,187,400. By 1957 it had declined by $ 64,731,500, a decrease of 4-1/2 %. [24]

On the thirty-two sites, prior to the departure of the old firms the assessed value was $ 16,299,300, barely 1% of the city total. Valuation dropped $ 1,697,000 in the four-year period on these sites. This 10% decrease is a substantially greater loss in assessed values than occurred in the city as a whole in the same period.

C. The Process of Adjustment

Reasons for moving. Why did the new firms leave their previous location ? This is an interesting question especially since these firms for the most part relocated near their former address. Of the 44 firms which answered this question,

- 24 moved primarily because they were expanding and wanted more and better space and/or facilities.
- 11 moved because they were displaced by public improvements, i.e. parking garages and highway construction.
- 6 moved because they were displaced by private parties. Either the owner of the building needed the space for expansion or the building was torn down for new construction.
- 3 moved because the old space became too valuable (expensive) for their operations.

During the years 1954-1957 a major highway, the Central Artery, was being constructed in the heart of Boston. This public improvement accounts for some of the displacement and upgrading of properties.

Up-grading of properties. The pessimists may not believe it, but five of the thirty sites were substantially up-graded in terms of either major improvements or a change to a function requiring more people-contacts. In all five of these premises more persons are now employed than before. Two of the properties increased in assessed valuation, one by 33% and the other by 66%.

Specifically, the following occurred on these five sites:

1. Change from warehouse (footloose wholesale) to office, linked wholesale, and linked industrial.
   Formerly contained one firm employing 125; now contains seven firms with 243 employees.
   Improvement attributable to Central Artery.
   No increase in assessment.
2. Change from footloose industrial to office.
   Employment increased from 200 to 360.
   Considerable improvements made, but since these premises are only a small part of the total building, the improvements are not reflected in increased assessments.
3. Change from footloose wholesale to linked wholesale and linked industrial.
   Employment increased.
   In conversion from single to multiple occupancy after old firm left, the building was improved, i.e. passenger elevator installed, etc.
   No increase in assessment.
4. Change from footloose industrial to office.
   Employment increased from 25 to 60.
   Major improvements resulted in a 66% increase in assessed valuation.
5. Change from linked wholesale to linked industrial.
   Employment increased from 21 to 200.
   Improvements resulted in a 33% increase in assessment.

It is difficult to determine whether any properties were down-graded as a result of the turnover. None of

the space is used by firms which require fewer people-contacts than the former occupants. On any given site, the new firms have the same or a higher degree of this kind of accessibility requirement. However, four of the five sites still entirely vacant are obsolete buildings, difficult to market for one reason or another. Perhaps these could be considered down-graded or even graded off the market.

D. Conclusions

The average number of employees of the new firms (33) is much closer to the Boston CBD average (38) than the average for the old firms (150) was. However, the new firms are not more labor-intensive than the old ones. It is possible that the new firms require a different kind of labor (unskilled vs. skilled, female vs. male), one heavily dependent on transit for transportation to work.

The increase in the number of firms and the decrease in employment and floor area per firm suggest that the small firm is better suited to a central location. On the other hand, the fact that none of the firms were less than ten years old seems to belie the "incubator function" for central areas.The kind of space vacated may, however, have biased this finding insofar as the incubator firm would require small and inexpensive quarters. In any case, it is clear that small firms are not necessarily new ones.

An important conclusion may be this: although the small, people-contact firms are on the increase in central areas, they are seeking less crowded quarters and more space per employee. The trend towards lower densities may not apply only to suburban industries; intown firms also are spreading out.

On the other hand, this finding of more space per employee among the new firms than the old may be the result of measuring the old firms at a time when they were fully grown in crowded quarters and catching the new firms when they had just moved to larger space with excess room for future expansion.

This less crowded use of space also probably accounts for some of the loss in employment on these sites. Thus, from the standpoint of Boston, more efficient operations may counterbalance the loss of jobs.

IV. EVALUATION

A. Comparison to Changes in Boston and in Massachusetts.

When the new and the old firms were put in the categories of the standard three-digit business classification used by the census, nine categories had two or more firms in them. In these nine categories, the changes in the number of firms in the city of Boston and in Massachusetts were recorded from 1953 through 1956, to see whether gains or losses in types of activities on the sites conformed to changes in the city as a whole. (See Appendix D.)

In the two categories under the heading Finance, Insurance and Real Estate the gain in number of firms was substantial on the vacated sites, in Boston, and in Massachusetts.[25] However, in only five of the nine categories did the gain or loss in number of firms parallel that in Boston or in Massachusetts. This is scarcely better than chance and may be accounted for by the limited sample, or more likely, by the special locational feature of the sites in question. That is, the fact that these are all central city sites makes it unlikely that the kinds of changes in activities on them would be similar to those for all of Boston or all of Massachusetts.

B. Comparison to Other Cities

Like Philadelphia, central Boston is experiencing an exodus of goods-handling manufacturers and an increase in business services. And, as in New York, it is the small firm which fares best in central Boston. In Cincinnati the space per establishment increased at the same time that the number of establishments was decreasing. Probably this is true in Boston also,

although on the sites in this study the area per establishment was lower after the turnover than before.

The distribution of firms did not differ in Boston from Murphy and Vance's findings. Furthermore, Boston firms, like those in Philadelphia, have a tendency to relocate near their former address. In several instances two or three firms shifted together from the old address to the same new location.

Conversion of old single-occupancy manufacturing buildings into multiple-occupancy linked wholesale and linked industrial space was also taking place in Boston as in New York. Rents in Boston are not as high as in Manhatten, about 60 cents compared to $ 1.65 a square foot, respectively, for loft space in unspecialized districts. According to an industrial realtor,[26] a highly rated firm in Boston can obtain a newly constructed, one-story building on a site in the rim for $ 1.25 a square foot net rental. (This excludes taxes, maintenance, insurance, heat.) Vernon stated that a new plant in a central New York location would rent for $ 3.-4.00 a square foot gross rental.[27]

C. Impact on Boston

The real impact on Boston of the turnover in activities on these sites is difficult to determine. It is, of course, possible to say that there has been a decrease in employment and assessed valuation. However, a greater loss in these may have occurred one step further back: maybe the premises which the firms new to these thirty sites left behind are really obsolete and have not been filled by other businesses. The chain of repercussions is infinite and cannot be traced to its end.

One way of evaluating cost or impact is by considering the "opportunities foregone". The sites were for

the most part reused. But could they have been occupied by more productive activities, perhaps by firms with high average pay scales ? Theoretically, the highest bidder, the one who could make the most profit out of the location, occupied the site. On the other hand, with a different public policy, a higher bidder might have been attracted. For instance, a research firm might have relocated intown if a direct, rapid transit line extended to the suburbs west of Boston where its employees live.

Furthermore, the most immediately profitable re-use may not result in the greatest benefit to the city. Thus, making available sites, possibly with public subsidy, to a medical center, for example, may not contribute to the tax base directly but may stimulate ancillary activities, conventions, etc. which do contribute to the economic vitality of the city. Every action means that other opportunities have been by-passed. Which ones were foregone in this case ?

Although it is not possible to prove the following statement on the basis of this thesis, it seems likely that, despite the loss in employment and taxes to the city, the shift in economic activities constitutes a better adjustment of activities and physical setting. If this has increased productivity, the whole metropolitan area is in a more favorable competitive position vis a vis other parts of the country. Therefore, indirectly, this shift contributes to the city's betterment as well.

D. Demand-supply Impediment

That there was a demand for decent space in central Boston is clear from this study. None of the good buildings had long periods of vacancy. Probably the difficulties

experienced in London in attempting to disperse activities would exist in Boston too. It is just impossible to get some kinds of firms out of the center ! In a mature economy, like that of Britain and the United States,there is a constantly increasing demand for services. Those services whose clients are other businesses rather than the consumer, are increasing rapidly in the central areas of cities.

From the standpoint of supplying real estate, Boston suffers like most built-up cities from the fact that the assessed valuation remains constant or declines while the cost of providing services increases. The result is, of course, that the tax rate climbs each year to fill the widening gap between income and expenditures. The tax rate in turn contributes to keeping revenue from real estate taxation down, because new construction goes to competing outlying areas where taxes are lower. It is indeed a vicious circle!

From the viewpoint of the realtor, taxes are the crux of the city's troubles, not only the high rate but also the practice of over-assessing property and then, after expensive and time-consuming litigation, granting abatements. The following quotation describes some of the effects of Boston tax practices:[28]

> "The nuisance and cost of battling contantly to secure reasonably equitable valuations and the sense of frustration engendered by the system of postponement and evasion to avoid prompt determination of tax appeal...naturally would lead property owners to sell their holdings in Boston when possible, and certainly would deter them from increasing their capital investment here by property improvements.
>
> "Undoubtedly, until this evil practice is stopped, apprehension of similar treatment as to assessment will continue as an important influence in the deliberations of merchants and industrialists desirous of enlarging their operations in Boston, or establishing themselves in the city."

In planning any scheme which requires the investment of private capital, it is essential to keep in mind not only the attributes of a particular project but also its competitive position. Capital is not tied to the Boston area; other parts of the country have allure. And for those firms which must buy and build in the Boston metropolitan area, the suburbs will continue to be attractive as long as the profit from central location does not outweigh the higher cost of space due to the tax differential.[29]

E. Recommendations

> "Economic change, which is indispensable to progress, must involve some shifts in the location of industries. It is not the aim of planning to thwart necessary changes, but to guide and control them so as to avoid their harmful effect." 30

Although it might be possible to prevent some firms from moving to the suburbs, any attempt to reverse trends which are taking place for sound economic reasons would only put the Boston area at a competitive disadvantage with other parts of the country.

What then are the trends in central city activities which should be supported ? This study, like others, has found that small firms, especially office space users, merchant wholesalers, and light industries which sell to or service other businesses, thrive in the center. Vernon pointed out that these firms with unstandardized inputs or outputs are not in a position to make long-term commitments. They must remain flexible in order to survive, expanding or contracting in space and employment as the market indicates.

This study found also that these small firms are expanding at lower employment densities.

Although it is tempting for the planner to deal with the big firm that has a certain future and can give surer answers, the planner must turn his attention to the needs of the many small businesses. They will continue to exist downtown long after the big company has left.

On the basis of findings in this thesis, the following action might be considered for Boston:

Assessments. Public improvements do affect property values. Assessments should be raised on properties which have a higher and more intensive use as a result of public improvements. When excess condemnation is prohibited by law, raising assessments is one way the public can recoup some of the investment in an improvement.

Industrial foundation. Some redevelopment projects are based on the mistaken assumption that because large manufacturers are moving to the suburbs in search of land, they would stay in the central city if land were available there. Firms which require much land and need a one-story plant have been decentralizing for many years, and the central city should not attempt to meet their needs.

On the other hand, firms which require central location generally want rented quarters. They are not often in a position to commit themselves to the construction of a single-occupancy building.

In Boston, with an abundant supply of second-hand loft space, no one will build multiple tenant structures on speculation; that is, no one who can obtain a higher return with less risk by investing his capital elsewhere.

Could the approach to the construction of new industrial buildings be similar to that for homes ? If social benefit warrants, the government underwrites the risk where private capital will not go without such

a guarantee. On this basis FHA was founded; and Boston might consider setting up an industrial foundation to underwrite the risk of long-term commitments which small firms are not in a position to make.

These foundations are not new. They have been tried successfully in a number of New England communities and they have been suggested by the Philadelphia and Pittsburgh chambers of commerce.[31] In Oklahoma City public industrial districts seem to live peaceably side by side with private competitors.[32]

If there is a demand for new rental quarters, if the reason that no one is constructing them on speculation is that there are more profitable alternative investments, and if there are benefits to the community in rebuilding Boston, then such a foundation might serve the city's interest. The if's would have to be searched out thoroughly, for, as the New York Streets project may yet show, only careful analysis and not pious hopes can do battle with the market mechanism.[33]

Small site redevelopment. Administrative efficiency always favors large projects in which masses of people or whole areas can be tidied up at one fell swoop. It has been pointed out repeatedly, however, that it is the small, sometimes uncertain firm which needs the central location. These firms are difficult to fit into the large schemes that redevelopers usually envisage.[34]

Industrial redevelopment or rehabilitation could learn a lesson from public housing and start out with "vest-pocket" projects. An old building removed to provide parking, or a lunch-hour square, or expansion for an adjacent factory: this kind of redevelopment is difficult to justify legally, to plan, and to administer; but it may be the only kind which will meet the varied and flexible and small-scale needs of central city firms.

Administrative changes. The demand for services has been on the increase, but the rate of productivity in services has not increased as rapidly as that in manufacturing and agriculture. If some services cannot afford as high-class space as other businesses, perhaps we will have to put up with an increasing number of second-hand buildings which still serve a function adequately but do not look new and shiny. A small town may have ten garbage collectors; a big city may need a hundred. Garbage-collecting buildings, unlike the people, show their use all week long. But they serve a vital function. We could not live without them. And as our metropolitan areas grow, we may have to put up with more and more of them.

Since most cities grew from the inside out, it is the central area which contains the vital second-hand buildings. From this location, however, activities which use them serve the entire metroplitan area. The problem of a declining tax base due to older, obsolescent buildings should be met by equalizing the tax burden in an area which is one economic unit. This requires administrative and governmental reorganization rather than any particular distribution of economic activities.

In conclusion, it is possible to view what has happened on these thirty-two sites not as an irreparable loss for Boston but rather as a better adjustment of activities and physical setting. It behooves Boston, then, not to look longingly after the large firm likely to leave sooner or later but instead to focus on making life good for the many small ones which will always require a central location.

FOOTNOTES

1. A.J.,Bone and Martin Wohl, Route 128 Study: A Survey of Industrial Development, (Preliminary Report) Presented at the Annual Meeting of the Highway Research Board, Jan. 1958, p. 10. This study served as a springboard for the thesis, and furnished all the information about the "old" firms.

2. R. M. Haig and R. C. McCrea, Major Economic Factors in Metropolitan Growth and Arrangement, Regional Survey of New York and its Environs, Vol. I, Russel Sage Foundation, 1927. p. 32.

3. Peter Self, The Planning of Industrial Location, Univ. of Londong Press, 1953. pp.24 and 10,respectively.

4. Haig, op. cit. p.35.

5. Raymond Vernon, "Production and Distribution in the Large Metropolis", The Annals of the American Academy of Political and Social Science, June 1957.

6. Raymond Vernon, "Space Costs", mimeographed copy, Second Draft, Nov. 5, 1957, p. 3. Source: Preliminary Release of 1954 Census of Manufacturers.

7. Vernon, "Production and Distribution...", p.19.

8. Haig, op. cit., p.104.

9. Ibid. p. 105.

10. Alderson and Sessions, Philadelphia Central Business Business District Study, Vol.I, Rev. Ed. 1951.p.24.

11. Cincinnati City Plan Commission, The Cincinnati CBD: Space Use Study, December 1956. p. 3.

12. Haig, op. cit. p.35.

13. Why Central Boston is the Best Location for your Business, published by the Building Owners and Managers Association of the Boston Real Estate Board. (no date).

14. Alfred E. Tumminia, Locational Factors for the Office Function of Industry, a thesis, Department of Housing and Planning, Columbia Univ., May 1953. p.46.

15. Vernon, "Space Costs...", Appendix D.

16. R.E. Murphy, J.E. Vance and Bart J. Epstein, Central Business District Studies, Clark Univ. Worcester, Mass. Jan. 1955. Table III, p.32.

17. Ibid. Table IV, p.39.

18. Vernon, "Space Costs...", p. 25.

19. Ibid. From 1947 to 1954 manufacturing jobs in Boston decreased by 6%; in Chicago and San Francisco by 8% each.

20. Vernon, "Production and Distribution..."

21. The classification used by Alderson and Sessions for Philadelphia activities suggests that there is a functional relationship between: retail and consumer services; wholesaling without stocks and business services; wholesaling with stocks and manufacturing... It would seem rather than a functional relationship, that it is a similar degree of need for "people-contacts" which results in the proximate location of these activities.

22. Shirley F. Weiss, The Central Business District in Transition, Research Paper No.1, City and Regional Planning Studies, Univ. of North Carolina, May 1957. p. 25.

23. If the floor space was used by a firm already in the building for expanding its storage area and no new employees were put into the space, then none were counted, unless the firm increased in employment at the same time. Thus the employment figure for the new firm is apt to be on the low side.

24. Assessed Values of Real Estate in Boston, Published by the Boston Real Estate Board, 1953. Also, (Boston) City Record, Saturday Jan. 11,1958, Vol. 50, No.2, p. 40

25. For classification, see Standard Industrial Classification Manual, published by the Bureau of the Budget, 1949. Information about the number of firms was obtained from the Massachusetts Division of Employment Security, Employment and Wages, published annually for cities and towns and for the State.

26. Mr. Robert Friedman, Executive Vice-president, Boston Wharf Company; personal interview, April 1958.

27. Vernon, "Space Costs...", p. 8.

28. "Finance Commission Says Hub Loses by Overvaluing Property", Christian Science Monitor, Aug. 13, 1953.

29. In a personal interview, a realtor of the Nordbloom Company stated that space in the suburbs could be obtained at ¢ 1. a square foot cheaper than in Boston because of the tax difference.

30. Self, op. cit., p. 12.

31. In Pittsburgh the function of the foundation would be "to acquire by purchase or lease, or otherwise, buildings and land and interests in buildings and land. To acquire, construct, reconstruct, alter, repair, maintain, operate, sell, convey, transfer, improve, develop and otherwise dispose of industrial buildings. To hold, own, improve, develop, and manage any real estate so acquired." A capital fund of ¢ 3 million was to be subscribed to by sponsors on a non-profit basis. See, Pittsburgh Chamber of Commerce, Prospectus: An Industrial Development Corporation for the Pittsburgh Region, 1953, p. 3.

32. "While both private developers and several civic groups control areas that are competitive in many respects, the development of these restricted districts helps to meet the city's industrial land requirements." p. 38, Urban Land Institute, Planned Industrial Districts, Technical Bulletin Number 19, October 1952.

33. In Marketability Studies - New York Streets Project, 1953, the Boston Housing Authority concluded that the 22 acres in the Project were marketable because:
    (1) there were no close-in competitive sites;
    (2) new plants can be constructed to compete favorably with prevailing industrial rents for available space; and
    (3) new plants produce operational savings which more than offset increased space costs.

    Not only are the conclusions and the way they were reached open to question, but also the demand aspect of the market seems to have been neglected.

34. Mr. Johnson of the Boston Redevelopment Authority in a personal interview stated that two small firms were turned away from the New York Streets Project while the Authority owned it because the Authority wanted to wholesale the area to one developer who would provide a comprehensive and orderly plan. It is unlikely that the developer is any more eager to accommodate the small, uncertain business.

APPENDIX A

CHARACTERISTICS OF THE VACATED SITES

(1) Site	(2) Floor area in sq. ft.	(3) Condition	(4) Vacancy	(5) Assessed Valuation on entire property. Before § (in thousands)	(6) After § (in thousands)
Core					
1.	15,200	Fair	none	$ 175	$ 175
2.	1,200	Fair	none	$ 500	$ 275
3.	25,000	Good	none	$ 2,300	$ 2,300
4.	7,300	Fair	none	$ 375	$ 375
5.	2,100	Good	none	$ 3,800	$ 3,800
6.	3,000	Good	none	$ 252	$ 127
7.	10,000	Poor	entirely	$ 23	-
8.	7,000	Poor	entirely	$ 85	-
9.	22,500	Fair	some	$ 125	-
10.	60,000	Good	some	$ 425	$ 425
11.	20,000	-	demolished	$ 100	-
12.	27,000	-	demolished	$ 16	-
13.	4,000	Poor	some	$ 275	$ 275
14.	120,000	Fair	some	$ 400	$ 400
Rim					
15.	42,000	Good	none	$ 2,500	$ 2,200
16.	15,000	Fair	none	$ 115	$ 72

§ "Before" refers to the year prior to the departure of the old firm; "After", to the time when the new firms have moved in.

(1) Site	(2) Floor area in sq. ft.	(3) Condition	(4) Vacancy	(5) Assessed Valuation on entire property	
				Before	After
Rim				(in thoudands)	
17.	150,000	Poor	entirely	$ 652	$ 415
18.	70,000	Good	none	$ 185	$ 167
19.	35,000	Fair	none	$ 85	$ 65
20.	15,000	Poor	some	$ 32	$ 35
21.	160,000	Good	some	$ 650	$ 650
22.	1,200	Good	none	$ 1,800	$ 1,500
23.	22,000	Fair	none	-	-
24.	10,000	Good	none	$ 6o	$ 60
25.	15,000	Good	some	$ 200	$ 100
26.	87,500	Poor	entirely	$ 243	$ 160
27.	10,000	Good	none	$ 15	$ 25
28.	3,500	Poor	none	$ 20	$ 21
29.	13,000	Fair	none	$ 16	$ 16
30.	16,000	Poor	entirely	$ 250	$ 120
31.	60,000	Good	none	$ 75	$ 100
32.	40,000	Good	none	$ 550	$ 550

Sources:

1. Information about the old firms ("Before") was obtained from the Route 128 Study currently being conducted by the Civil and Sanitary Engineering Department of M.I.T. under the direction of Professor A.J. Bone and Martin Wohl. In conjunction with this Study firms which vacated these thirty-two sites were interviewed in the summer of 1957.

2. Information about the new firms ("After") and about the sites was obtained through personal interviews and inspection.

3. Assessed valuations were obtained from Assessed Values of Real Estate in Boston, published annually by the Boston Real Estate Board.

APPENDIX B

CHARACTERISTICS OF THE FIRMS ON EACH SITE

(1) Site	(2) Year vacated	(3) Number of new firms	(4) Type of Activity Before	(5) Type of Activity After	(6) Employment Before	(7) Employment After
Core						
1.	1957	1	Retail	Retail	90	30
2.	1955	1	Office	Office	5	12
3.	1955	15	Office	Office	300	350
4.	1956	1	Linked wholesale	Linked wholesale	15	-
5.	1956	1	Office	Office	43	2
6.	1955	1	Linked wholesale	Office	12	15
7.	1957	-	Linked industrial	vacant	500	-
8.	1957	-	Linked Industrial	vacant	(same firm as § 7)	-
9.	1957	1	Linked industrial	Retail	(same firm as § 7)	-
10.	1957	1	Linked industrial	Linked industrial	(same firm as § 7)	150
11.	1954	-	Footloose wholesale	-	110	-
12.	1955	-	Footloose industrial	-	40	-
13.	1955	1	Linked wholesale	Linked industrial	25	25
14.	1956	7	Footloose wholesale	1 - Office 3 - Linkd. indus. 3 - Linkd. whlsle.	125	243
Rim						
15.	1956	1	Footloose industrial	Office	200	360

(1) Site	(2) Year vacated	(3) Number of new firms	(4) Type of Activity Before	(5) Type of Activity After	(6) Employment Before	(7) Employment After
Rim						
16.	1954	1	Ftlse. whlsle.	Linkd. indus.	7	5
17.	1954	-	Ftlse. indus.	-	225	-
18.	1954	10	Ftlse. whlsle.	1-Office 4-Linkd. indus. 5-Linkd. whlsle.	150	209
19.	1954	1	Ftlse. whlsle.	Ftlse. whlsle.	(same as § 18)	2
20.	1954	2	Ftlse. whlsle.	1-Ftlse. whlsle. 1-Linkd. indus.	(same as § 18)	12
21.	1954	6	Linkd. indus.	4-Linkd. indus. 1-Linkd. whlsle. 1-Ftlsle. whlsle.	1400	634
22.	1955	1	Office	Office	10	-
23.	1955	2	Linkd. whlsle.	Linkd. whlsle.	33	18
24.	1955	2	Office	Office	18	11
25.	1955	1	Ftlse. whlsle.	Ftlse. whlsle.	50	8
26.	1957	-	Ftlsle. indus.	-	410	-
27.	1956	1	Linkd. indus.	Office	25	60
28.	1956	1	Linkd. indus.	Linkd. indus.	9	-
29.	1955	1	Linkd. whlsle.	Linkd. whsle.	8	15
30.	1954	-	Office	-	60	-
31.	1954	1	Linkd. whlsle.	Linkd. indus.	21	200
32.	1956	1	Ftlse. whlsle.	Linkd. whlsle.	18	9

Source: See Appendix A

APPENDIX C

CHARACTERISTICS OF EACH TYPE OF ACTIVITY

	(1) Before	(2) After	(3) Gain or Loss	
Square feet of floor area				
Retail	15,200	18,900	plus	3,700
Office	55,500	104,500	plus	49,000
Linked industrial	273,000	330,000	plus	57,000
Linked wholesale	109,300	172,300	plus	63,000
Footloose wholesale	330,000	67,500	minus	262,500
Footloose industrial	306,000	-	minus	306,500
Total	1,089,500	693,200	vacant	349,300
			demolished	47,000
Number of firms				
Retail	1	2	plus	1
Office	6	25	plus	19
Linked industrial	7	17	plus	10
Linked wholesale	6	13	plus	7
Footloose wholesale	8	4	minus	4
Footloose industrial	4	-	minus	4
Total	32	61	plus	29
Average number of sq. ft. per firm				
Retail	(15,200)	(9,500)		
Office	9,250	4,180		
Linked industrial	39,000	19,410		
Linked wholesale	18,210	13,250		
Footloose wholesale	41,250	16,870		
Footloose industrial	76,660	-		
All types	34,050	11,630		
Number of employees in same floor area				
Retail	90	30	minus	60
Office	435	525	plus	90
Linked industrial	1,934	1,294	minus	640
Linked wholesale	114	160	plus	46
Footloose wholesale	460	19	minus	441
Footloose industrial	875	-	minus	875
Total	3,908	2,028	minus	1,880

	(1) Before	(2) After	(3) Gain or Loss
Average number of employees per firm			
Retail	(90)	(15)	
Office	72	21	
Linked industrial	273	76	
Linked wholesale	23	12	
Footloose wholesale	57	5	
Footloose industrial	350	-	
All types	150	33	
Average number of sq. ft. per employee			
Retail	(170)	(506)	
Office	127	200	
Linked industrial	142	257	
Linked wholesale	950	1,070	
Footloose wholesale	725	(3,540)	
Footloose industrial	350	-	
All types	410	506	
Location: number of firms in Core or Rim			
Retail	1-Core 0-Rim	2-Core 0-Rim	plus 1-Core
Office	3-Core 3-Rim	19-Core 6-Rim	plus 16-Core plus 3-Rim
Linked industrial	4-Core 3-Rim	5-Core 12-Rim	plus 1-Core plus 9-Rim
Linked wholesale	3-Core 3-Rim	4-Core 9-Rim	plus 1-Core plus 6-Rim
Footloose wholesale	2-Core 6-Rim	0-Core 4-Rim	minus 2-Core minus 2-Rim
Footloose industrial	1-Core 3-Rim	0-Core 0-Rim	minus 1-Core minus 3-Rim
All types	14-Core 18-Rim	30-Core 31-Rim	plus 16-Core plus 13-Rim

Source: See Appendix A

APPENDIX D

GAIN OR LOSS IN NUMBER OF FIRMS IN STANDARD CLASSIFICATION CATEGORIES ON THE SITES, IN BOSTON, AND IN MASSACHUSETTS, 1953 TO 1957

	On Site	In Boston	In Massachusetts
Manufacturing			
313: Boot and Shoe Cut Stock and Findings	plus- 3	minus- 7	minus-17
394: Toys and Sporting Athletic Goods	minus- 2	minus- 5	minus-17
Wholesale and Retail Trade			
502: Chemicals, Drugs and Allied Products	minus- 3	minus-14	plus-16
503: Dry Goods and Apparel	plus- 7	minus-16	plus- 5
506: Electrical Goods	minus-3	minus- 2	plus-17
507: Furniture and House Furnishings	minus- 2	plus- 5	plus-26
509: Miscellaneous Wholesale Merchants	plus- 7	minus- 7	minus- 7
Finance, Insurance, and Real Estate			
641: Insurance Agents, Brokers and Services	plus-13	plus-32	plus-134
739: Business services, not elsewhere classified	plus- 2	plus-21	plus-116

Source: Massachusetts Division of Employment Security, Employment and Wages, published annually for cities and towns and for the State. Available at the Research Division, Massachusetts Department of Commerce.

Firms were classified according to Standard Industrial Classification Manual, (1949).

BIBLIOGRAPHY

Assessed Values of Real Estate in Boston, published annually by the Boston Real Estate Board, 1953-1957.

Bone, A. J. and Martin Wohl, Route 128 Study: Survey of Industrial Development, (Preliminary Report), Presented at the Annual Meeting of the Highway Research Board, Wash. D.C., January 8, 1958.

Boston City Planning Board, "Non-Residential Study: 1953 Space-use Inventory Program, Summary", December 1952.

Boston Finance Commission, Report to the Mayor and City Council on the Current Tax Rate, October 10, 1957.

Boston Housing Authority, Urban Redevelopment Division, Marketability Studies - New York Streets Project, 1953.

Chicago Plan Commission, Redevelopment for Industry, Industrial Study No. 1, March 1951.

Cincinnati City Planning Commission, The Cincinnati CBD Space Use Study, December 1956.

Cuzzort, Raymond P., Suburbanization of Service Industries within Standard Metropolitan Areas, Scripps Foundation for Research in Population Problems, Oxford, Ohio, 1955.

Denver Planning Office, Central Area Land Use: Reasons for Location and Change, C.A.P. Bulletin No. 2, March 1957.

Federal Reserve Bank of Boston, "Industrial Foundations", Monthly Review, Vol. 32, No. 1, January 1950.

- - "Community Industry Financing Plans in New England", Monthly Review, Vol. 32, No. 7, July 1950.

Haig, R.M. and R.C. McCrea, Major Economic Factors in Metropolitan Growth and Arrangement, Regional Survey of New York and its Environs, Vol. I, Russel Sage Foundation, 1927.

Hollingshead, E.D., "Migration of Industry", Urban Land, Vol. 16, No. 10, November 1957.

Kitagawa, Evelyn M. and Donald Bogue, Suburbanization of Manufacturing Activity within Standard Metropolitan Areas, Scripps Foundation for Research in Population Problems, Oxford, Ohio, 1955.

Murphy, R. E. and J.E. Vance, Jr. and Bart J. Epstein, Central Business District Studies, Clark University, Worcester, Mass., January 1955.

Philadelphia City Planning Commission, Industrial Land Use for Philadelphia, Comprehensive Plan Report No.1, December 1950.

Philadelphia Department of Commerce, A Program for Industrial Land Development within the Corporate Limits of Philadelphia, September 1954.

Pittsburgh Chamber of Commerce, Prospectus: An Industrial Development Corporation for the Pittsburgh Region, 1955.

Rannels, John, The Core of the City, A Study of Changing Land Uses in Central Business Districts, Columbia Univ. Press, New York, 1956.

Self, Peter, Cities in Flood, Faber and Faber, London 1957.

- - The Planning of Industrial Location, Univ. of London Press, 1953.

Tumminia, Alfred E., Locational Factors for the Office Function of Industry, a thesis, Department of Housing and Planning, Columbia Univ., May 1953.

Urban Land Institute, Planned Industrial Districts, Technical Bulletin Number 19, October 1952.

Vernon, Raymond, "Production and Distribution in the Large Metropolis", The Annals, American Academy of Political and Social Science, June 1957.

- - "Space Costs", mimeographed copy, Second Draft, November 5, 1957.

Weiss, Shirley F., The Central Business District in Transition, Research Paper No.1, City and Regional Planning Studies, Univ. of North Carolina, May 1957.

Why Central Boston is the Best Location for Your Business, published by the Building Owners and Managers Association of the Boston Real Estate Board, (no date).

Wrigley, Robert L., Jr., "Organized Industrial Districts", Journal of Land and Public Utility Economics, Volume XXIII, No. 2, May 1947.